



**Academic Council  
Graduate Studies Committee**

November 26, 2024  
9:00 a.m. – 11:00 a.m.

Via Google Meet

Join: <https://meet.google.com/cqx-oqam-fad>

Or dial: (CA) +1 778-746-8746 PIN: 209 917 155#

**All Meeting Materials**

**Graduate Studies Committee Agenda, Materials and Minutes**

**AGENDA**

1. **Approval of the Agenda and Land Acknowledgement** **P. Mirza-Babaei**
2. **Approval of the Minutes of the Meeting of October 22, 2024\*** **P. Mirza-Babaei**
3. **Business Arising from the Minutes** **P. Mirza-Babaei**
4. **Comments from the Chair\*** **P. Mirza-Babaei**
5. **Cyclical Program Review (Approval)**
  - 5.1 Faculty of Science – MSc and PhD in Modelling and Computational Science – Final Assessment Report and Program Learning Outcomes\* (M) **D. Papke**
6. **Faculty Reports**
  - a) Faculty Reports\*
  - b) Graduate Student Report
  - c) Library Report
7. **For Information:**
  - 7.1 Minor Curricular Changes
    - Course Change – [HLSC 5320UG](#), [NURS 5096G](#), [MSPI 5001G](#), [MSPI 5002G](#)
  - 7.2 Graduate, Associate Graduate, and Emeriti faculty: Appointments
    - Associate Graduate Faculty**
      - Education, Anna Rodrigues, Mitch and Leslie Frazer Faculty of Education
      - Nuclear Engineering, Alvaro Joffre Uribe Quevedo, Faculty of Business and Information Technology
      - Computer Science, Michael Glueck, Faculty of Science

### **Graduate Faculty**

- Education, Efrosini Papaconstantinou, Faculty of Health Sciences

### **Emeritus Graduate Faculty**

- Electrical and Computer Engineering, Vijay Sood, Faculty of Engineering and Applied Science
- Electrical and Computer Engineering, Ramiro Liscano, Faculty of Engineering and Applied Science
- Software Engineering, Ramiro Liscano, Faculty of Engineering and Applied Science

## **8. Call for Volunteer for Land Acknowledgement for January Meeting**

## **9. Termination**

## **10. Colleagues Exchange**

- Generative AI and Graduate Studies\*

**Academic Council Graduate Studies Committee**  
**Tuesday, October 22, 2024**  
**9:00 a.m. – 9:38 a.m.**

Via Google Meet

[Graduate Studies Committee Agendas, Materials and Minutes 2024-2025](#)

**MINUTES**

**Present:** C. Cesaroni (Chair), J. Abbas Dick, J. Arcand, R. Bailey, A. Cooper, C. Davidson, F. Gaspari, L. Harkins, S. Jackson, A. Kiani, O. Marques, C. McGregor, P. Mirza-Babaei, D. Papke, F. Quereshi, J. Stokes, A. Tokuhiko, R. Van Oostveen, L. VanVeen, N. Wattie, K. Wilson, A. Wingate

**Staff & Guests:** K. Ayotte (Secretary), S. Baglay, N. Crow, M. Heslip, S. Heydari, A. Kassaris, K. McCartney, J. Pereira, S. Windsor

**Regrets:** D. Bonetta, K. Clarke, K. Elgazzar, L. Livingston, H. MacPherson, S. Marsh, A. Slane

**C. Cesaroni called the meeting to order at 9:00 a.m. and read aloud the Land Acknowledgement.**

**1. Approval of the Agenda**

*Upon a motion duly made by N. Wattie and seconded by R. Bailey, the October 22, 2024, GSC agenda was approved as presented.*

**2. Approval of the Minutes of the Meeting of September 24, 2024**

*Upon a motion duly made by F. Gaspari and seconded by J. Arcand, the September 24, 2024 Minutes were approved as presented.*

**3. Business Arising from the Minutes**

None.

**4. Comments from the Chair**

The Chair began by highlighting several upcoming events, starting with the Annual GSC Graduate Student Poster Showcase on November 27, 2024, at Charles Hall, noting that 43 students are already registered, and that the deadline has been extended to October 24, 2024. She also mentioned a virtual town hall on November 7, 2024, focused on managing student mental health and faculty wellness, with

registration details included in the materials package. Lastly, she highlighted a Graduate Studies Info Session for third to fifth-year undergraduates with a GPA of 2.7 or higher on October 30, 2024, in the UB Mezzanine, aimed at recruiting students into graduate programs.

In response to a question regarding the recruitment of graduate students from outside Ontario Tech, the Chair confirmed ongoing efforts, which include a recent meeting with the recruitment team. J. Stokes mentioned a focus on Ontario universities, with plans to attend a dozen grad fairs, as well as online webinars to reach students from other provinces and abroad in the future. He also noted that despite international caps, they continue to recruit international students. The Chair also noted plans to streamline external student inquiries to the recruitment team and acknowledged the suggestion to provide supervisors with tools, such as a one-page summary of financial aid, to support recruitment, particularly for thesis-based programs.

The Chair highlighted recent events, including the Hackathon Idealathon for fusion energy with Brilliant Catalyst, the Strategic Partnership Office and the Canadian Nuclear Laboratory (CNL) on October 9th and 11<sup>th</sup> and reminded attendees about the Inspiring Students tab on Basecamp, which features graduate students who have recently defended their thesis.

## **5. New Program Proposal**

### **5.1 Faculty of Business and IT, PhD Cybersecurity\* (M)**

The Chair invited S. Heydari to present the FBIT PhD in Cybersecurity new program proposal. S. Heydari noted that this is the first PhD program at FBIT and of its kind in Canada.

In response to a question regarding pathways for students from non-research-based professional degrees like the Master of Information Technology Security (MITS) program, S. Heydari clarified that the admission requirements align with typical PhD programs at Ontario Tech and currently, a pathway exists for MITS graduates who have completed the project-based program and have worked with a faculty member, provided they meet certain academic requirements. He noted that the current focus is on MITS graduates due to their course content suitability, but there may be potential to consider pathways from other professional master's programs in the future.

S. Heydari corrected that the projected enrollment would start in Fall 2025.

Responding to a question regarding core course requirements, S. Heydari clarified that the program includes three core courses, determined by the student's research area and chosen by their supervisory committee. Students without an IT security background must complete two prerequisite courses: Fundamentals of IT Security and Law and Ethics of IT Security. Applicants from

a professional program like MITS will also take the Research Methods course, totaling nine credits in prerequisites before the core courses. Students with a MITS background only require the Research Methods course plus the three core courses. He noted that applicants with a master's in cybersecurity may not need prerequisites and will take three specialized courses instead. He highlighted that course requirements will vary based on the student's background.

**Motion:**

*Upon a motion duly made by P. Mirza-Babaei and seconded by J. Arcand, that GSC hereby recommends to Academic Council the approval of the PhD in Cybersecurity program and the subsequent recommendation of the program to the Board.*

**6. Reports**

- i. Faculty of Business and IT
  - No updates
- ii. Faculty of Engineering and Applied Science
  - No updates
- iii. Mitch and Leslie Frazer Faculty of Education
  - R. Van Oostveen noted that recruitment has been successful, including a series of seminars that were hosted throughout the Fall.
  - A. Cooper noted that the traditional thesis model of the EdD program creates capacity challenges in the department. An open meeting with faculty will be held to discuss strategies for managing faculty workload and making the program experience more practical.

The Chair noted a request to allow for virtual participation in the upcoming Research Showcase, recognizing that many faculty and graduate students are located off-site. They are committed to offering a virtual component next year for those unable to attend in person.

R. Van Oostveen suggested that, since the FEd BA program is fully online, virtual recruitment for third and fourth-year students would be beneficial. The Chair acknowledged this and mentioned it would be discussed at upcoming recruitment meetings, along with plans to consider a follow-up virtual recruitment option after assessing attendance at the in-person session.

- iv. Faculty of Health Science
  - J. Abbass Dick noted that they have two alumni events happening that will have alumni from Trent and Ontario Tech present their research and provide tips and tricks to current students in November.
- v. Faculty of Science
  - No updates.
- vi. Faculty of Social Science and Humanities
  - Reference submitted written report.

vii. Graduate Student Report

- No updates.

viii. Library Report

- Reference submitted written report.

**7. For Information**

**7.1 2024-2025 Revisions to the Graduate Academic Schedule\***

**7.2 2024-2025 Draft GSC Work Plan\***

**7.3 Associate Graduate Faculty**

- Materials Science, Rachel Wortis, Faculty of Science
- Materials Science, Aaron Slepko, Faculty of Science
- Materials Science, Balaji Subramanian, Faculty of Science
- Materials Science, Andrew Vreugdenhil, Faculty of Science
- Materials Science, Carlo Bradac, Faculty of Science
- Materials Science, Rayf Shiell, Faculty of Science
- Materials Science, Bill Atkinson, Faculty of Science
- Applied Bioscience, Peter Lewis, Faculty of Business and Information Technology
- Computer Science, Eric Rapos, Faculty of Science
- Computer Science, Nicholas Provat, Faculty of Science

**8. Other Business**

C. Davidson volunteered to provide the November Land Acknowledgement.

The Chair reminded attendees that immediately following this meeting, the Colleagues Exchange will be discussing Thesis- Based admissions and the upcoming Mental Health Seminar.

**Termination**

*There being no other business, upon a motion duly made by F. Gaspari the October 22, 2024, GSC meeting terminated at 9:38 a.m.*

Kirstie Ayotte, Assistant University Secretary

# Graduate Studies Committee

## Report of the Chair – November 26, 2024

**Chair: Pejman Mirza-Babaei, PhD – Professor and Associate Dean SGPS**

### Land Acknowledgement

*Ontario Tech University acknowledges the lands and people of the Mississaugas of Scugog Island First Nation. We are thankful to be welcomed on these lands in friendship. The lands we are situated on are covered under the Williams Treaties and the traditional territory of the Mississaugas, a branch of the greater Anishinaabeg Nation, including Algonquin, Ojibway, Odawa and Pottawatomi. These lands remain home to a number of Indigenous nations and people.*

*We acknowledge this land out of respect for the Indigenous nations who have cared for Turtle Island, also called North America, from before the arrival of settler peoples until this day. Most importantly, we remember the history of these lands has been tainted by poor treatment and a lack of friendship with the First Nations who call them home.*

*This history is something we are all affected by as we are all treaty people in Canada. We all have a shared history to reflect on, and each of us is affected by this history in different ways. Our past defines our present, but if we move forward as friends and allies, then it does not have to define our future.*

### Chair's Remarks – November 2024

#### SGPS Updates and Events

**Gail Fuller** will be retiring at the end of December. Her contributions to SGPS and our university community have been invaluable, and I want to take a moment to sincerely thank her for all she has done. Gail has been with Ontario Tech for 15 years. She started out working in Payroll and held positions in Accounts Payable/Receivable. She worked in OCIS as an Administrator working with the budget officer. Gail has been the Graduate Services Coordinator in SGPS for the last 10 years. During that time she has provided exemplary service for our graduate students by overseeing graduate student financial support; supporting GRA processes and the administration of TA/RA's; managing payment plans for International Students and approving and supporting revisions to graduate student support packages.

A university-wide drop in retirement celebration will be held **on Monday, December 16 in SIRC1350**. Further details will be included in the Weekly Report.

#### 2024 SGPS Research Poster Showcase

The School of Graduate and Postdoctoral Studies (SGPS) is excited to present the first annual SGPS Research Poster Showcase. The showcase will provide graduate students and postdoctoral fellows with an excellent opportunity to present their research or focus of study in poster format and enhance their presentation skills, receive constructive feedback and build their professional network. We have over 60 students registered! Prizes will be awarded in each of three categories - Best Overall (\$500), Best Visuals (\$250) and Most Innovative (\$250).

The showcase event will be held on **Wednesday, November 27 from 5-7 p.m. at Charles Hall**.

## **Recruitment Discussions**

SGPS Associate Deans have been meeting with faculty GPD's to discuss recruitment, what is currently being done and how SGPS can support these initiatives.

**Postdoctoral Fellows Coffee with the Deans** will be held on **Tuesday, February 4 from 10:00 to 11:30** a.m. in the Dixon/Alger Fireside Reading Room. Postdocs will be invited to join the Dean and Associate Deans of the School of Graduate and Postdoctoral Studies for coffee, tea and treats. The event will provide opportunities for networking and exchanging ideas in a relaxed setting.

A **Graduate Studies Networking & Information Session** was held on Wednesday, October 30 from 4 to 6 p.m. This in-person event provided an exclusive opportunity for 3rd, 4th and 5th year undergraduate students to come and learn about grad studies at Ontario Tech. Faculty and graduate students from each Faculty were on hand to answer questions. Approximately 50 students attended the event.

**The Women in Research Council in partnership with the School of Graduate and Postdoctoral Studies** hosted a panel on Wednesday, November 13 titled "The Ins and Outs of Academic and Industry Career Pathways." The event was moderated by the WIRC chair and featured five panelists, including 3 current Ontario Tech postdoctoral fellows and 2 industry researchers. The panelists provided insights into their career pathways, advice on what to look for when navigating the job market and the pros and cons of different career trajectories. The event had 50 registered attendees, with approximately 37 who attended. The session included time for audience questions and allowed for strong engagement with the audience.

**The 5th annual Canadian Career Symposium** was held on November 19-21, 2024. This free virtual symposium was open to graduate students and postdoctoral fellows. Sessions were aimed at professional development and career exploration.

## **Canadian Association for Graduate Studies (CAGS) Conference 2024**

I wanted to share some of my key takeaways from CAGS Conference held in Toronto (29 Oct - 1 Nov). Please let me know if you would like more details on any of these points, I'd be happy to share my full notes or set up a time to discuss further!

### **Generative AI and Academic Integrity**

A lot of discussions on the rising role of generative AI in academia and particularly in gradates studies. We allocated time for the "Colleagues Exchange" session after this meeting to discuss this a bit further. I attached two reports on this topic to help our discussion:

- Western Canadian Deans of Graduate Studies (WCDGS) - Generative AI and Graduate and Postdoctoral Research and Supervision.

- Ontario Council on Graduate Studies (OCGS) - AI Considerations for Graduate Research.

### **Supervision and Progress Reporting**

Discussion regarding shift from traditional progress reports to "Individual Development Plans (IDPs)": IDPs are more personalised and focus on the student's overall academic, professional, and personal development. They encourage students and supervisors to align goals, identify skills gaps, and create actionable plans for success. This approach is seen as more effective in tracking progress and fostering long-term growth than the traditional reporting.



## **Admissions**

A growing number of institutions are adopting “holistic admission processes”: These consider various aspects of a candidate's career (e.g., professional achievements, research experience, community engagement, personal circumstances) rather than focusing solely on academic grades. This shift aims to promote greater equity in admissions, ensuring that applicants from diverse backgrounds are fairly evaluated.

## **Recruitment**

Many universities share similar challenges in recruitment, particularly in the following areas:

- **Financial Constraints:** Hiring restrictions limit the ability to bring in new faculty. Supervisor capacity is often stretched, impacting their ability to take on new students.
- **IRCC Restrictions:** International student recruitment is hindered by immigration policies and delays.
- **Limited Diversity in Recruitment Sources:** Many institutions primarily recruit from their own graduates, which can limit the diversity of perspectives and experiences in their programs.

## **Scholarship Updates**

CGS-D Doctoral nominations (3 CIHR, 3 NSERC and 3 SSHRC) were put forward on November 21st.

## **Base Camp, Grad Pro Skills and Graduate Engagement**

### **Grad Pro Skills**

- LinkedIn 101 - November 1, 2024
- Writing a Research Proposal, November 6, 2024
- Interview Skills, November 7, 2024
- Presentation Skills, November 15, 2024

### **Graduate Engagement**

- Inaugural SGPS Research Poster Showcase, November 27, 2024

## **Graduate Student and Postdoc Celebrations!**

The following students submitted their final thesis packages and successfully completed their program during the past month:

Student: Glory Gabel

Program: Master of Health Sciences

Thesis Title: Perspectives on Dementia Education: A Phenomenological Investigation in Institutional and Community-Based Settings

Supervisor: Winnie Sun

Faculty: Health Sciences

Completed: October 17, 2024

Student: Austin Page  
Program: MASC in Electrical and Computer Engineering  
Thesis Title: Smart Monitoring of Cybersecurity Incidents Using Machine Learning  
Supervisor: Akarmaul Azim  
Faculty: Engineering and Applied Science  
Completed: October 24, 2024

Student: Bitu Porrang  
Program: MASc in Mechanical Engineering  
Thesis Title: Modeling the Material Behavior of Fused Filament Fabricated 17-4 PH Stainless Steel Under the Influence of Porosity  
Supervisor: Sayyed Ali Hosseini  
Faculty: Engineering and Applied Science  
Completed: October 29, 2024

Student: Darryen Sands  
Program: MSc in Modelling and Computational Science  
Thesis Title: Cluster Detection in General Markov Chains with Applications to Directed Networks  
Supervisor: Jane Breen  
Faculty: Science  
Completed: October 30, 2024

Student: Hamidreza Rouzegar  
Program: MASc in Electrical and Computer Engineering  
Thesis Title: LLM-Powered Active Learning for Cost-Effective Text Classification  
Supervisor: Masoud Makrehchi  
Faculty: Engineering and Applied Science  
Completed: October 31, 2024

Student: Arsh Chowdhry  
Program: MSc in Computer Science  
Thesis Title: Discovering Trade-offs between Fairness and Accuracy in Machine Learning Systems: A Multi-objective Approach  
Supervisor: Peter Lewis  
Faculty: Science  
Completed: November 7, 2024

Student: Angela Walsh  
Program: MA in Education  
Thesis Title: The Use of Mobile Devices to Help Young Children Learn About Indigenous Perspectives Through Environmental Inquiry  
Supervisor: Brenda Jacobs & Ann LeSage  
Faculty: Education  
Completed: November 8, 2024

## GRADUATE STUDIES COMMITTEE REPORT

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### ACTION REQUESTED:

- Recommendation   
Decision   
Discussion/Direction   
Information

**DATE:** 26 November 2024

**FROM:** Centre for Institutional Quality Enhancement

**SUBJECT:** Cyclical Program Review – Final Assessment Report and Program Learning Outcomes - MSc and PhD in Modelling and Computational Science

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### COMMITTEE MANDATE:

In accordance with Article 8 of the Ontario Tech University Institutional Quality Assurance Process (IQAP) Cyclical Review (CPR) and Auditing Procedures, the appropriate standing committee of Academic Council (USC or GSC) is responsible for approving the Final Assessment Report (FAR), Executive Summary, and Implementation Plan (IP) resulting from the Review.

Additionally, in accordance with Article 6 of the IQAP Curriculum Change Procedures, editorial revisions to Program Learning Outcomes are considered Minor Program Adjustments and are sent to the standing committee for approval.

### MOTION FOR CONSIDERATION:

That GSC hereby approve the Final Assessment Report, Executive Summary, Implementation Plan, and the revised Program Learning Outcomes resulting from the MSc and PhD in Modelling and Computational Science Cyclical Program Review, as presented.

### BACKGROUND/CONTEXT & RATIONALE:

In academic years 2021 – 2023 a program review was scheduled for the MSc and PhD in Modelling and Computational Science. The site visit was conducted in April 2024. At the completion of a CPR the appropriate standing committee of Academic Council (USC or GSC) will review and approve the FAR, Executive Summary, and IP that synthesize the recommendations resulting from the review, identify the strengths of the program as well as the opportunities for program improvement and enhancement, and outline the agreed-upon implementation plans for this improvement.

### RESOURCES REQUIRED:

The Faculty's plans to address any resource needs are outlined in the Implementation Plan. Information and support will be required from various areas of the University in order to implement the plan.

The resources identified in the Implementation Plan have been reviewed by the Academic Resource Committee and will be allocated as necessary to successfully support this program.

### **COMPLIANCE WITH POLICY/LEGISLATION:**

The Ontario Universities Council on Quality Assurance (Quality Council), established by the Council of Ontario Universities in July 2010, is responsible for oversight of the Quality Assurance Framework processes for Ontario Universities. The Council operates at arm's length from both Ontario's publicly assisted universities and Ontario's government. Under the Quality Assurance Framework, academic programs must undergo a cyclical review at least every eight years following their implementation. The purpose of the cyclical program review is to critically examine the components of a program with the assistance of outside reviewers with the goal of continuous improvement. A program review's purpose is not solely to demonstrate the positive aspects of the program, but also to outline opportunities that will lead to improvements for the future.

### **CONSULTATION AND APPROVAL:**

The Academic Resource Committee reviewed the Implementation Plan 8 October 2024. The Implementation Plan was presented to Faculty Council (FSc) on 10 September 2024.

### **NEXT STEPS:**

- Following the approval of GSC, the Executive Summary and IP will be sent to Academic Council and the Board of Governors for information. The FAR, Executive Summary and IP will be sent to the Quality Council as required under the Quality Assurance Framework. A summary report is then posted on the Ontario Tech corporate website.
- The approved FAR, Executive Summary, and IP will be provided to the Faculty, through the Dean, to serve as the basis for the continuous improvement and monitoring of the program. A report from the program outlining the progress that has been made in implementing the recommendations will be put forward in eighteen months' time.

### **SUPPORTING REFERENCE MATERIALS:**

- Final Assessment Report
- Implementation Plan
- Executive Summary
- PLO Enhancement Summary



**FINAL ASSESSMENT REPORT**  
**October 9, 2024**  
**MSc and PhD in Modelling and Computational Science**  
**Program Review**  
**Dean: Dr. Ken Wilson, PhD**

Under Ontario Tech University's Institutional Quality Assurance Process (IQAP) and the Ontario Quality Assurance Framework (QAF), all programs are subject to a comprehensive review at least/at minimum every eight years to ensure that they continue to meet provincial quality assurance requirements and to support their ongoing rigour and coherence. Program reviews involve several stages, including:

1. A comprehensive and analytical self-study brief developed by members of the program under review.
2. A site visit by academic experts who are external to and arm's length from the program. The visit involves discussions with senior academic administrators, faculty, staff, and students.
3. Submission of an external reviewers' report including recommendations on ways the program may be improved based on a review of the program's self-study brief, discussions during the site visit and supporting material.
4. Internal responses to the external review and recommendations prepared separately by the Program and Dean.
5. Development of an Implementation Plan prepared by the Dean including resource requirements and a timeline for acting on and monitoring the implementation of the recommendations.

On the completion of the program review, the Implementation Plan is reviewed by the Provost, through the Resource Committee, to examine resource implications. The Resource Committee prepares a summary report and CIQE prepares this Final Assessment Report (FAR) and an Executive Summary suitable for publication. The FAR, Executive Summary, and Implementation Plan are then presented to the appropriate standing committee of Academic Council (USC/GSC). Upon USC/GSC approval, the Executive Summary and Implementation Plan are provided to Academic

Council and the Board of Governors for information, sent to the Quality Council as required under the Quality Assurance Framework, and posted on the Ontario Tech corporate website.

In academic years 2021-2023, a program review was scheduled for the MSc and PhD in Modelling and Computational Science. The internal assessment team is to be commended for undertaking this assignment in addition to an already challenging workload and within a very tight timeline.

This is the second program review for this program. Enhancements implemented as a result of the previous review were:

- addition of a “breadth requirement” in the curriculum, permitting students to take a choice of three out of four courses rather than a prescribed three.
- Steering Committee has established a \$20,000/year minimum funding for students

The following pages synthesize the reports and recommendations resulting from the review, identifying the strengths of the program as well as the opportunities for program improvement and enhancement. A report from the Dean, on behalf of the Faculty, outlining the progress that has been made in implementing the recommendations will also be put forward in eighteen months’ time.

#### **External Reviewers:**

**Siv Sivaloganathan, University of Waterloo**

**Wenyng Feng, Trent University**

**Site Visit: April 17-18, 2024**

#### **Program Overview**

Mathematical modelling is an important tool in the study of real problems be they physical, biological, industrial, or any other discipline. The field of computational science combines the implementation of mathematical models, computer algorithms and knowledge in a particular area of application in order to provide an additional tool for the study of phenomena and, in particular, to facilitate the study of problems that are intractable or difficult to study using other approaches. Mathematical modelling and computational science are powerful methods to study problems such as atmospheric phenomena, climate variability, molecular behaviour of matter, protein folding, option pricing in financial markets, and many other physical, biological, medical, environmental and economic problems.

#### **Significant Strengths of the Program**

The review of the Modelling and Computational Science program highlighted several strengths, including its interdisciplinary faculty, emphasis on research and experiential learning, and commitment to continuous improvement.

## **Opportunities for Program Improvement and Enhancement**

Areas for improvement were also identified, such as addressing variations in incoming students' skill levels, ensuring coherence across diverse student backgrounds, and strengthening industry partnerships to continually improve the quality of the students' experience.

## **The External Review**

The site visit took place on April 17-18, 2024. Drs. Sivaloganathan and Feng met with members of the Faculty as well as key stakeholders at the University, including:

Dr. Lori Livingston, Provost  
Dr. Sean Forrester, Interim Dean of Science  
Dr. Lennaert van Veen, Chair of Internal Assessment Team  
Dr. Carla Cesaroni, Associate Dean, Graduate and Postdoctoral Studies  
Staff from the School of Graduate and Postdoctoral Studies  
Catie Sahadath, Associate University Librarian, Scholarly Resources  
Kaelan Caspary, STEM and Data Librarian  
Faculty, Staff and Students from the Faculty of Science  
Members of the Internal Assessment Team

The external reviewers were invited to acknowledge and provide evidence of any clearly innovative aspects of the program and to identify and commend notably strong and creative attributes of the program relative to other such programs. The Faculty was grateful for the thoughtful and thorough review provided.

## **Reviewer Recommendations and Internal Responses**

The external reviewers identified 9 recommendations. The Faculty of Science values the recommendations and the Program and Dean have been very thoughtful in their responses.

The reviewers' recommendations are listed below in priority sequence, along with the corresponding responses from the Program and Dean.

### **Recommendation 1**

Increase graduate student funding (paying attention to international students), so that funding levels are in line with other research-intensive universities in southern Ontario and take into account the cost of living in the GTA area.

### **Program's Response**

We agree that this would be desirable, both in order to offer a fair compensation for the students' labour and to aid with recruitment. Most of our GRAs are drawn from NSERC Discovery funds. How much we will be able to raise the salaries thus depends on how much the Discovery grants will grow. We hope they will at least grow in step with inflation. In addition, all faculty are on the lookout for additional funding, like MITACS, and we actively coach the students when they write their OGS and NSERC scholarship proposals.

**Dean's Response**

Concerns about the level of graduate funding, particularly in terms of international students, has been raised in other recent graduate program reviews. We note that we expect to see increased funding from Tri-Council funded students in September, consistent with a promise from the federal government. The institutional capacity to provide additional funding has proven to be a challenge. Grad student funding was identified as a priority as part of a new fundraising campaign. We will monitor the outcome of that effort and will continue to look for more opportunities to provide better funding packages. We also intend to maintain the GITS scholarship to support international students.

**Recommendation 2**

Hire a tenure-track statistician/biostatistician. This would bolster the Program significantly and is currently an important field not covered in the Science Faculty.

**Program's Response**

While we do not expect to see room in the faculty budget for this new hire in the next year or two, there is hope that we can find synergy with other groups, like Applied Biosciences (MSc & PhD) and Forensic Science (undergrad). All these groups are interested in adding expertise in the area of statistics.

**Dean's Response**

The Dean agrees, both in terms of present funding challenges and the potential for a collaborative approach to a hire in this area. For example, in response to some vacant CRC positions in the university, we recently submitted a proposal that one of these positions be allocated.

**Recommendation 3**

Develop preparatory courses or resources to address disparities in programming and foundational mathematics skills among incoming students, ensuring all students have a strong foundation for success.

**Program's Response**

We have decided to first focus on programming skills, as these vary greatly among incoming students and strongly impact the success in, and enjoyment of, our courses. A subcommittee of the Steering Committee has been formed to draft a course that will initially be cross-listed with 4th year undergrad math and physics. It will teach scientific programming and data science as well as elements of testing and repository management. If successful (in terms of learning outcomes and enrolment), we will proceed with a second course on statistics. These courses will be offered as elective when there is a need and do not require resources from the faculty beyond credit for curriculum development.

**Dean's Response**

The Dean looks forward to a more detailed proposal on the development of such a course.



#### **Recommendation 4**

Reduction of teaching loads to 3 courses/year for research faculty who publish, hold an NSERC grant and supervise 2+ graduate students (at least one of whom is a PhD student).

#### **Program's Response**

The teaching load of our faculty and the recognition of student supervision (or lack thereof) is the topic of ongoing discussions between the faculty union and the university leadership. If any changes are made, these will result from the negotiations around the next collective bargain agreement.

#### **Dean's Response**

While the Dean recognizes the potential value of reduced teaching workload, the workload model is determined by the institution in a manner consistent with the collective agreement. The Dean does not believe that a reduced teaching load will be an option for the foreseeable future.

#### **Recommendation 5**

Strengthen industry partnerships to provide more opportunities for experiential learning and align the curriculum with current industry trends, enhancing students' real-world application skills.

#### **Program's Response**

This is primarily the responsibility of individual faculty members. Funds provided by, e.g., MITACS or NSERC Alliance enable us to recruit more students and offer a better salary. The faculty member must build a relationship with an appropriate company and ensure that the proposed project fits the program and has sufficient scientific depth. One way in which the GPD helps with this task is by inviting alumni to campus to present to faculty and students an overview of the company they work for and their job content.

#### **Dean's Response**

The engagement in partnerships with industry does lie primarily with individual faculty and their interests. While the Dean, GPD, VP Research and others can and do identify potential opportunities for such collaborations, it is still the individual faculty member's prerogative to decide what to pursue. On the other hand, the School of Graduate and Postdoctoral Studies does offer a wide range of Graduate Professional Skills training and workshops (e.g., Base Camp sessions), ranging from instructor-directed workshops to self-directed e-learning, certificates and micro-credentials. These supports provide a lot of additional training opportunities for our grad students to be successful in the workplace. Another example of strengthening industry partnerships is the SGPS agreement with Chalk River Nuclear Facility, which will include 17 students and 4 faculty spending a week at that facility. We will look for similar opportunities with MCSC industrial partners.

### **Recommendation 6**

Increase the breadth of courses in the books (all of which need not be offered on a regular basis), some of these would be available and offered when there is sufficient demand. Course breadth can also be achieved through joint offerings with other academic institutions in the area (e.g. Trent U).

### **Program's Response**

After we received the report from the reviewers, we held a retreat in which we listed topics we may want to include in our courses, while making sure that all students acquire certain core skills. For instance, some of the techniques of Network Theory and Markov Chains, that Dr. Jane Breen often uses, can be included in our course on Discrete Units or in Numerical Analysis. Such changes are minor and do not require formal procedures. They will be overseen and approved by the Steering Committee. The GPD has also reached out to the Fields Institute to explore the possibilities of offering courses there.

### **Dean's Response**

The program's approach to increasing the breadth of content exposure for students seems appropriate.

### **Recommendation 7**

The Program should also consider offering courses through the Fields "Academy". This would enable faculty to reach a broader student audience and could potentially attract future graduate students to Ontario Tech and this Program (NB Fields also offers compensation of roughly \$10K to the Institution for such courses).

### **Program's Response**

(included in response to Recommendation 6)

### **Dean's Response**

The program's approach to increasing the breadth of content exposure for students (including the potential for courses run through the Fields Academy) seems appropriate to investigate. Costs, trade-offs and potential benefits will need to be considered as well.

### **Recommendation 8**

Implement a robust system for ongoing program evaluation and monitoring, collecting feedback from stakeholders and tracking student outcomes to inform programmatic changes and ensure responsiveness to evolving needs.

### **Program's Response**

This has been a challenge indeed as there is no central portal where the GPD (or the research supervisor) can see what forms have been submitted for a student, what courses they have taken with what outcome and so forth. Two developments are worth mentioning in this respect. Firstly, the appointment of a graduate academic advisor with access to that information. They can act as intermediary in case of

trouble and talk to the GPD, the supervisor or the student on behalf of Grad Studies. Secondly, Grad Studies has started to digitalize most of its forms. The next step will be to make them available in a repository that is visible to the GPD and the Graduate Secretary.

### **Dean's Response**

We believe that the reviewers and the program faculty are speaking about two different, if somewhat related, issues. The reviewers seem to be focusing on the frequency of program evaluation and monitoring. The Ontario government has established a seven year program review cycle. The reviewers suggest that such efforts should be handled more regularly. We can see how this would be valuable, but such an approach (and the associated resourcing) would not be exclusive to this one program. Given that we expect to be in a resource-constrained period for a number of years, we do not deem it likely to get additional human resources to support analysis (e.g., Graduate Program Directors get one course release, per the collective agreement). We will, however, explore with the Institutional Research Office the possibility of providing regularly-updated data on student performance and graduation rates for the program.

The program response focuses on challenges with assessing prospective graduate students that may be seeking to enter the program. It describes well the recent improvements in terms of information access and supports in SGPS, however we do not believe this is what the reviewers were referring to.

### **Recommendation 9**

Provide logistical and financial support for recruitment/promotion efforts.

### **Program's Response**

Some support from Grad Studies and Recruitment is available, for instance for setting up booths and distributing flyers. The program has a small budget for attending fairs. If and when the faculty identify a good opportunity for recruitment, the GPD will negotiate with the Deans of Science and Grad Studies for incidental additional funds.

### **Dean's Response**

The Dean(s) look forward to some concrete proposals.

**Due Date for 18-Month Follow-up Report:    January 9, 2026**  
**Date of Next Cyclical Review:                    2029-2031**



**IMPLEMENTATION PLAN**  
**June 2024**  
**MSc and PhD in Modelling and Computational Science**  
**Program Review**  
**Prepared by: Dr. Greg Crawford**

The table below presents a timeline of the follow-up and resource requirements addressing the recommendations from the external reviewers’ report. The Dean solicits feedback on this Implementation Plan through Faculty Council.

<b>Recommendation</b> <i>(corresponding # from reviewers’ report)</i>		<b>Action Item(s)</b>	<b>Specify role of person responsible</b>	<b>Timeline for action and monitoring</b>	<b>Resource Requirements</b>
1.	Increase graduate student funding (paying attention to international students), so that funding levels are in line with other research-intensive universities in southern Ontario and take into account the cost of living in the GTA area.	Monitor progress of graduate funding initiative within the new external fundraising campaign	Dean of Science (in conjunction with Advancement Office and Dean, SGPS)	Annual assessment of progress / success - July 2025  Annual assessment of progress / success - July 2026	N/A  N/A
2.	Hire a tenure-track statistician/biostatistician.	Pursue potential for a CRC hire in bioinformatics (a collaborative approach)	Dean of Science	(Waiting to hear status of current proposal)	N/A
3.	Develop preparatory courses or resources to address disparities in programming and foundational mathematics skills among	Subcommittee of Steering Committee to draft a course proposal	GPD	December 2024	If developed and approved, will need to

	incoming students, ensuring all students have a strong foundation for success.				determine how to resource its delivery
6.	Increase the breadth of courses in the books (all of which need not be offered on a regular basis), some of these would be available and offered when there is sufficient demand. Course breadth can also be achieved through joint offerings with other academic institutions in the area (e.g. Trent U).	Review potential topics for courses and assess how to include in course rotation	GPD (in consultation with program faculty and Dean)	December 2024	Currently assuming no net new courses per year. If more courses end up being offered, they will need to be resourced.
7.	The Program should also consider offering courses through the Fields “Academy”. This would enable faculty to reach a broader student audience and could potentially attract future graduate students to Ontario Tech and this Program (NB Fields also offers compensation of roughly \$10K to the Institution for such courses).	Review potential for working with Fields institute to assess course options available there	GPD (in consultation with program faculty and Dean)	December 2024	Funding implications need to be determined
8.	Implement a robust system for ongoing program evaluation and monitoring, collecting feedback from stakeholders and tracking student outcomes to inform programmatic changes and ensure responsiveness to evolving needs.	Discuss with Institutional Research Office if graduation rates and student performance data can be generated automatically and routinely made available to GPDs	Dean	October 2024	TBD

## Recommendations not Addressed and Rationale

#	Recommendation not Addressed	Rationale
4.	Reduction of teaching loads to 3 courses/year for research faculty who publish, hold an NSERC grant and supervise 2+ graduate students (at least one of whom is a PhD student).	The workload model is determined by the institution in a manner consistent with the collective agreement and, to the extent possible, consistent across Faculties.
5.	Strengthen industry partnerships to provide more opportunities for experiential learning and align the curriculum with current industry trends, enhancing students' real-world application skills.	Industry engagement lies primarily with individual faculty members and their interests. We note SGPS offers a wide range of Graduate Professional Skills training and workshops (e.g., Base Camp sessions).
9.	Provide logistical and financial support for recruitment/promotion efforts.	We recognize this to be an important issue. Rather than establishing specific goals and timelines, our approach will be to have program faculty determine if and where key recruitment opportunities exist. At that point, the ideas will be communicated to and discussed with Dean by the GPD. We hope this will lead some concrete improvements in recruitment efforts (e.g., with an annual budget ask).



## FINAL ASSESSMENT REPORT Executive Summary Cyclical Program Review

<b>Degree Program:</b>	<b>MSc and PhD in Modelling and Computational Science</b>
<b>Components:</b>	
<b>Dean:</b>	<b>Dr. Ken Wilson</b>
<b>Date:</b>	<b>October 2024</b>

Under Ontario Tech University's Institutional Quality Assurance Process (IQAP) and the Ontario Quality Assurance Framework (QAF), all programs are subject to a comprehensive review at least/at minimum every eight years to ensure that they continue to meet provincial quality assurance requirements and to support their ongoing rigour and coherence.

In academic years 2021-2023, a program review was scheduled for the Master and PhD in Modelling and Computational Science. This is the second program review for this program. A timeline of the review is provided below.

<b>Program Review Timeline</b>	<b>Date</b>
Program Review start date:	Nov. 22, 2022
Self Study submitted/approved:	April 2, 2024
Site Visit:	April 17-18, 2024
External Reviewers Report received:	April 29, 2024
Program Response received:	June 10, 2024
Decanal Response received:	June 25, 2024

Based on the self-study, the reviewers were asked to consider ways in which new topics can be incorporated into existing courses or new elective courses, and how to streamline the incorporation of teaching from other Faculties.

The reviewers commended the program for its engagement with industry experts to inform course content, innovative approaches to content delivery, the Faculty’s strong and diverse expertise, and their commitment to student mentoring, engagement and success.

The site visit took place on **April 17 and 18, 2024**.

The review consisted of two external reviewers. During the in-person site visit, the reviewers met with the following groups and individuals:

- Dr. Lori Livingston, Provost
- Dr. Sean Forrester, Interim Dean of Science
- Dr. Lennaert van Veen, Chair of Internal Assessment Team
- Dr. Carla Cesaroni, Associate Dean, Graduate and Postdoctoral Studies
- Staff from the School of Graduate and Postdoctoral Studies
- Kaelan Caspary, STEM and Data Librarian
- Catie Sahadath, Associate University Librarian, Scholarly Resources
- Faculty, Staff and Students from the Faculty of Science
- Members of the Internal Assessment Team

The external reviewers submitted 9 recommendations identifying specific steps to be taken to improve the program. The reviewers highlighted areas of improvement pertaining to program structure, faculty workload, and strengthening industry partnerships. The prioritized list of recommendations is available in the Implementation Plan.

A Final Assessment Report (FAR) has been prepared to synthesize the reports and recommendations resulting from the review, identifying the strengths of the program as well as the opportunities for program improvement and enhancement. The Implementation Plan (IP) presents a timeline of the follow-up and resource requirements addressing the recommendations from the external reviewers’ report. Both documents, accompanied by this Executive Summary (ES), were delivered to the appropriate standing committee of Academic Council (USC/GSC) and approved on November 26, 2024.

<b>Governance</b>	<b>Document(s)</b>	<b>Type of review</b>	<b>Date</b>
Faculty Council	IP	Feedback	September 10, 2024
Resource Committee	IP	Resource review	October 8, 2024
USC/GSC	FAR, ES, IP	Approval	November 26, 2024
Quality Council	FAR, ES, IP	QAF requirement	
Academic Council	ES, IP	For information	
Board of Governors	ES, IP	For information	
Corporate Website	ES, IP	QAF requirement	

**Due Date for 18-Month Follow-up Report: January 9, 2026**

**Date of Next Cyclical Review: 2029-2031**

**Timeframe for associated site visit: Fall 2030**





**Cyclical Program Review: Summary of program learning outcome enhancements**

[This form should be used in cases where program learning outcomes have been enhanced for an existing undergraduate or graduate program as the result of a cyclical program review. The program and course learning outcomes must be reviewed and revised using resources provided by CIQE and the Teaching and Learning Centre (TLC). This form will be appended to the Final Assessment Report and presented at the appropriate standing committee of Academic Council (USC or GSC) for approval.]

<b>Faculty:</b> Faculty of Science	
<b>Program:</b> MSc/PhD Modelling and Computational Science	
<b>Review year:</b> 2021-2023	
<b>Undergraduate:</b> <input type="checkbox"/>	<b>Graduate:</b> x

**Original program learning outcome(s):** *(last reviewed in 2021)*

1. Review the existing literature related to a specific scientific subject. (MSc and PhD)
2. Analyze a practical problem and choose (or formulate) a suitable model to describe it (e.g., continuous/discrete, deterministic/stochastic, etc.). (MSc and PhD)
3. Identify (or develop) appropriate simulation approaches, algorithms, numerical schemes, and analytic methods for solving a problem at hand. (MSc and PhD)
4. Implement codes (using existing packages when appropriate) within practical scientific computational environments. (MSc and PhD)
5. Evaluate and interpret computed results critically. (MSc and PhD)
6. Communicate scientific ideas, concepts and results effectively in writing and verbally. (MSc and PhD)
7. Transfer modelling and computational skills to a variety of domain-specific contexts. (MSc and PhD)
8. Develop predictive models based on structured and unstructured data. (MSc and PhD)
9. Effectively visualize output and analysis from computational models. (MSc and PhD)
10. Formulate specific research questions relevant to challenges in modelling and computational science. (PhD only)
11. Demonstrate critical awareness of the relevant scientific literature, current problems and new knowledge about a particular area of research within modelling and computational science. (PhD only)

**Total number of original outcomes:** 11

**Proposed enhanced learning outcomes:** (Updated outcomes as a result of the program review learning outcome workshops)

1. Analyze and extract relevant aspects of the existing literature related to a specific subject in Modelling and Computational Science. (MSc and PhD)
2. Analyze a practical problem and select or formulate a suitable model to describe it. (MSc and PhD)
3. Identify or develop appropriate simulation approaches, algorithms, numerical schemes, and analytic methods for model characterization. (MSc and PhD)
4. Write and implement codes for scientific computing, including appropriate HPC techniques. (MSc and PhD)
5. Evaluate, analyze, visualize and interpret computed results. (MSc and PhD)
6. Communicate scientific and technical ideas, concepts and results effectively, in writing and verbally, at a level appropriate for the audience. (MSc and PhD)
7. Transfer modelling and computational skills to a variety of contexts. (MSc and PhD)
8. Build and utilize project management skills to work efficiently in interdisciplinary groups.
9. Formulate specific research questions relevant to challenges in modelling and computational science. (PhD only)
10. Demonstrate critical awareness of the relevant scientific literature, current problems and new knowledge about a particular area of research within modelling and computational science. (PhD only)

**Total number of enhanced outcomes: 10**

**Have the enhanced outcomes been mapped to the degree-level expectations (DLEs)?**

Yes       No

**If no, this should be completed no later than:**

**Are you providing any additional supporting documents?  Yes       No**

**If yes, which (list all)?**

**GDLE alignment map available upon request from CIQE**

**CIQE INTERNAL APPROVAL**

Appended to FAR	
FAR, Outcomes, Executive Summary, Implementation Plan approved by USC/GSC	
Final Approved FAR, Outcomes, Executive Summary and Implementation Plan sent to Faculty, through the Dean, as primary owner	
Outcomes entered into Curriculog	

## **Preamble**

This report template is designed for use by the members of the Graduate Studies Committee (GSC) at Ontario Tech University to facilitate focused and strategic discussions in the Graduate Studies Committee meetings. Reports will support understanding of developments and discussions across Faculties and Departments. The purpose of this template is to:

- Showcase achievements and innovative initiatives.
- Share collaborative efforts within and outside the university.
- Outline strategic goals and plans for graduate studies.

The template guides the presentation of information in a structured and concise manner, enabling productive dialogue and strategic planning.

## **Graduate Studies Committee Report Template**

*Faculty / Unit / Society Represented:* **Criminology, FSSH**

*Submitted By:* **Olga Marques, GPD**

### **Section 1: Departmental Highlights and Achievements**

- *Major Achievements:* Hosted Virtual Information Session about the MA Criminology program for interested internal students (8 November 2024)
- *Innovative Initiatives:*

### **Section 2: Collaborative Efforts and Interdisciplinary Activities**

- *Internal Collaborations:*
- *External Partnerships:* Invited to speak about MA and PhD Criminology programs at Trent University Child and Youth Studies Program – Post-Grad Virtual Information Session.

### **Section 3: Strategic Development and Future Plans**

- *Strategic Goal Setting / Open Meetings:*
- *Upcoming Projects/Initiatives:*
  - i. Planning a Virtual Open House for Criminology MA and PhD Programs for external interested students.
  - ii. Discussing addition of 3<sup>rd</sup> stream for MA Criminology program – course-work only

### **Section 4: Additional Information**

- *Noteworthy Mentions / Shout outs:*
- *Graduate courses or events requiring support or amplification:*

## **Save the Date & Upcoming Events**

- *Next Graduate Studies/Faculty Council meeting:*
- *Upcoming consultation on programs or initiatives:*

*Event 1: Date/Brief Description*

*Event 2: Date/Brief Description*

## Graduate Studies Committee Report Template

*Faculty / Unit / Society Represented: FSSH- Forensic Psychology*

*Submitted By: Leigh Harkins*

### **Section 1: Departmental Highlights and Achievements**

- *Major Achievements:*
- *Innovative Initiatives:*

We hosted our first **Virtual Open House** and it was successful. We had 35 attendees from across Canada (recruited by sending a flyer and program information to Psychology programs across Canada, posting on faculty members' social media, and emailing the flyer and information to prospective students who have been in touch with faculty members).

### **Section 2: Collaborative Efforts and Interdisciplinary Activities**

- *Internal Collaborations:*
- *External Partnerships*

### **Section 3: Strategic Development and Future Plans**

- *Strategic Goal Setting / Open Meetings:*
- *Upcoming Projects/Initiatives:*

We're submitting a minor program modification (to come to GSC for information once approved at our FC) to remove our requirement for a 3<sup>rd</sup> reference letter.

### **Section 4: Additional Information**

- *Noteworthy Mentions / Shout outs:*
- *Graduate courses or events requiring support or amplification:*

# Artificial Intelligence: Considerations for Graduate Research

Ontario Council on Graduate Studies

October 2024

# Artificial Intelligence: Considerations for Graduate Research

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## Ontario Council on Graduate Studies

October 2024

*This document will be revisited and updated in 2026.*

### Introduction

Generative artificial intelligence (AI) uses machine learning to generate new content in the form of text, audio, video, code and images. While AI is not new – researchers have been working with machine learning and deep learning for decades – the popularization of generative AI with the launch of ChatGPT in November 2022 has changed public awareness of its potential. Alongside growing awareness, there has also been an acceleration of developments in AI with new or improving large language models (LLMs) and associated tools rapidly being released.

The opportunities and challenges that generative AI tools present for graduate research are both complex and contextual. Differences in institutional approach, discipline, supervisor and student values, and research areas make broad recommendations challenging; likewise, different granting agencies and journals have or will have unique approaches to the responsible use of generative AI.

This document aims to provide an overview of the questions that graduate schools, graduate supervisors, and graduate students may have with respect to generative AI and graduate research, as well as some possible approaches to these questions. It focuses primarily on the graduate research enterprise, recognizing that in some instances these questions will apply to other aspects of graduate studies, including coursework. This document does not aim to be prescriptive or interpreted as policy; rather, it aims to stimulate local and contextual discussion and decisions by providing broad considerations.

### What are some of the capabilities of generative AI and how could it be used in graduate research?

With thousands of tools, and additional capabilities emerging, the possibilities for the use of generative AI in graduate research are many. Some of the common capabilities of foundational models and tools like OpenAI's ChatGPT, Microsoft's Copilot, Anthropic's Claude, and Google's Gemini include summarizing, simulations, translation, outlining and brainstorming, data analysis and visualization, textual analysis, image generation and interpretation, captioning and transcription, video creation, copy editing, audio production and analysis, and more.

For graduate students these capabilities may be explored in different phases of graduate research from ideation to structuring research, to conducting research, to dissemination of findings, and to knowledge translation. Possible use cases might include using generative AI to identify research gaps in existing literature, framing research questions, developing literature

reviews, drafting qualitative or quantitative instruments, analyzing and interpreting data, drafting written or visual analysis, or shifting academic writing to plain language.

While these applications may benefit all graduate researchers, the capabilities of these tools may increase accessibility for graduate researchers with disabilities. For instance, the ability of a generative AI tool to provide a summary of a meeting transcript, to describe images and videos in text or spoken language, or to compose text, may increase accessibility. The potential for greater accessibility with generative AI tools continues to be explored.

Likewise, translation capabilities of these tools introduce opportunities for students for whom English is an additional language or for graduate research that benefits from translation as part of knowledge mobilization.

Given the sheer breadth of capability and the range of possible uses within graduate research, it is prudent for individual graduate programs and graduate supervisors to carefully consider what aspects of the program or individual field of study might benefit from the integration of generative AI, and what areas may not. While these conversations may currently take place between individual supervisors and graduate students, there will be a need for consistency across supervisors, programs and institutions. The following questions are intended to stimulate these individual conversations; OCGS remains attentive to communicating emerging norms.

### **How are academics approaching the use of generative AI in graduate studies so far?**

Perceptions on the use and value of generative AI for graduate studies understandably vary, often significantly, among individuals, academic disciplinary cultures, and institutional settings.

In some disciplines, where machine learning has a longer history, there is broader understanding of the capabilities and limitations of AI, as well as recognition of the strengths of this technology for solving problems that were previously intractable.

In other disciplines, AI calls to the fore questions of ethical engagement and social and environmental responsibilities.

Just as there are disciplinary differences, there may be differences between how supervisors and graduate students approach AI. For supervisors there is a call to understand and evaluate the possible value of generative AI alongside their graduate students; for graduate students there is an invitation to discuss the same with their supervisors. For both supervisors and graduate students, the imperative to transparently discuss and share when generative AI will be or has been used is essential for both building trust and establishing norms of use.

Likewise, should a supervisor find opportunities to use generative AI tools in the practices of graduate supervision – providing formative feedback, summarizing relevant literature, etc. – a similar and shared expectation of transparency and citation of use is warranted.

In all areas of the university and across all roles, there is a need to weigh the potential value of responsibly used generative AI against its risks and challenges. Some of those risks and challenges include maintaining data security and privacy to protect intellectual property, hallucinations and bias in outputs, environmental impact of model development and tool use,



and questions of AI governance and policy at the national and international levels, including issues of copyright and AI safety. Understanding these risks and staying current on developments in AI technology is its own challenge.

For graduate research, in particular, the use of generative AI cannot compromise the unique contribution of the researcher as creating knowledge or its application. Indeed, the purpose of graduate research – the pursuit and creation of new knowledge through curiosity and critical engagement – cannot be matched by that of generative AI.

### **Given the capabilities of generative AI, should graduate degree level expectations or the values of graduate research change?**

No. In keeping with the [OCGS Principles for Graduate Study at Ontario Universities](#), graduate students, both master's and doctoral, are assessed within their disciplines and against the degree level expectations of all graduate studies at Ontario universities and elsewhere, inclusive of depth and breadth of knowledge, conceptual and methodological awareness, communication skills, application of knowledge, professional capacity/autonomy, and awareness of limits of knowledge. Central to these expectations are the values of curiosity, integrity, transparency, and accountability.

While generative AI may change parts of the process of graduate research and may, over time, inflict these degree level expectations, these core expectations for all graduate students remain. Less concretely, but no less significantly, graduate research holds the reward of well-articulated knowledge advancement and innovation made possible by human ingenuity, curiosity and critical thinking. Novel contributions to research are required both for the betterment of our world, and – perhaps more cynically – for the further development and operation of the data sources on which generative AI tools are trained. If generative AI can enhance parts of the process of graduate research, the researcher remains accountable for, and ennobled by, each decision in the research process.

It is the expectation that if generative AI is used by graduate students, it will be in service of support or enhancement of the achievements of graduate research, but never as a substitute.

### **Given the capabilities of generative AI, should program learning outcomes, scope of graduate research, or graduate research activities change?**

Yes. As generative AI tools and their capabilities are further explored and better understood within disciplinary settings, there stand to be shifted or expanded competencies and outcomes within graduate programs and for graduate researchers.

Just as each graduate program envisions the program learning outcomes, program structures to achieve those outcomes, and assessments to ensure the successful completion of the outcomes, each program will find occasion – perhaps through the institutional quality assurance process – to reexamine the goals of the program in light of the capabilities of generative AI. For instance, common outcomes related to completion of a literature review might be expanded to include critical appraisal of an AI-produced literature review.

## **What are the implications of generative AI for graduate research and academic integrity?**

Institutions have different academic integrity policies and processes, just as different institutions and disciplines are developing norms and expectations on referencing, citation and acknowledgement of the use of generative AI tools in academic work. Nevertheless, there are core principles of academic integrity that apply across all our academic endeavors and institutions: integrity, information security, transparency, accountability, ownership, and responsibility. Graduate students as individuals and as authors of the thesis have ultimate responsibility for understanding and adhering to the academic integrity policies and expectations of their institution. Graduate programs have the responsibility to develop and implement assessments of graduate students that confer confidence in the capabilities and competencies of their graduates (see evaluation below).

Wherever possible, supervisors and supervisory committees should provide clear guidance and expectations on if and how generative AI can be used by the graduate student in the research process and in the dissemination of findings. These expectations should also include how the graduate student should transparently declare and acknowledge when and how generative AI tools were used. It is worth emphasizing that the norms of referencing are evolving, and that different disciplines and institutions are approaching referencing practices with some variation.

## **What are the implications for evaluating the attainment of program learning outcomes and degree level expectations?**

Just as conversations about evaluation are evolving at the undergraduate level and in course-based master's programs, there will be need for reflection and revision to evaluation practices across graduate research programs.

When a graduate researcher's oral defense is most successful it demonstrates a value at the heart of the research enterprise: peer review. That is to say, the graduate researcher's oral defense is an occasion both to safeguard and validate the student's competencies and capabilities, but is also an opportunity to gather academic peers for thoughtful engagement with the research, to probe and test the research, enter into the discussion with openness to new ideas, to contemplate alternative perspectives and frameworks, and to push the boundaries of what is already known. While the candidacy/comprehensive/qualifying exam and oral defense is a means of ensuring academic integrity, its primary purpose ought always to be the demonstration of this rich tradition of peer engagement and scholarly inquiry.

With that, graduate programs and units are encouraged to engage in collective conversations about acceptable uses of generative AI across the discipline or program, as well as how to reference such use in policies and processes. Each institution will have different means of enabling and supporting these conversations; the quality assurance process may be one possible means of holding such discussions.

## **What comes next?**

The Ontario Council on Graduate Studies (OCGS) will continue to discuss the impact of generative AI on graduate research. Some known areas of further work include the

development of resources for graduate students on generative AI, as well as resources for oral examination committees. Suggestions or comments on this document, or additional areas of support are welcome and can be directed to Katarina Todić, Senior Policy Analyst, COU ([ktodic@cou.ca](mailto:ktodic@cou.ca)).

## Conversation Starters

Below are some questions that supervisors and graduate students may discuss in deciding when and how generative AI could be used in graduate studies. These questions are framed as institutionally and disciplinarily agnostic and may be adapted depending on disciplinary and institutional contexts. Likewise, these questions are not intended to be definitive or to limit other areas of consideration that may be relevant to an institution or the student's research. Finally, these conversations about AI use could occur more than once as graduate research takes place and as advances in the technology unfolds.

## Supervisor and Graduate Student Conversation Guide

- 1. What do you [the graduate student/the graduate supervisor] already know about generative AI and what might you need to learn before incorporating these tools into your graduate research? What is your individual approach to generative AI? What do you believe about its value or risks?**

### Possible discussion prompts:

- How would you describe your 'philosophy of AI use'? When, how, and why do you think AI should be used in research?
- How might generative AI intersect with, influence, or impact your professional goals?

- 2. What scholarly activities within my graduate research may benefit from the use of generative AI? How could it enhance my ability to achieve the [degree level expectations](#) and program learning outcomes?**

### Possible discussion prompts:

- What value might generative AI bring?
- What impact might using generative AI for [this task] have on my core learning experience as a graduate student?
- What phases of the research process and research activities would most benefit from the inclusion of generative AI?

**Examples:** translation, copy-editing, brainstorming, concept explanation, drafting, coding, data analysis, data visualization, drafting, simulations, literature reviews

- 3. What scholarly activities within my graduate research should not involve the use of generative AI? In which cases would the use of generative AI lessen or preclude my ability to achieve the degree level expectations and program learning outcomes?**

### Possible discussion prompts:

- What might be some of the risks of using generative AI to complete [this task] or [this part]?
- What could be some of the negative impacts on my studies, colleagues or my disciplinary community if generative AI was used for [this part]?
- What impact might using generative AI for [this task] have on my core learning experience as a graduate student?

**Examples:** translation, drafting, data analysis, data visualization, interpretation and analysis, synthesis, literature reviews

#### 4. What benefit or risk does the use of generative AI pose for me as a graduate researcher?

### Possible discussion prompts:

- What generative AI tool(s) will I use and what risks or benefits does that tool offer for data security and privacy?

**Examples:** accessibility features, data sovereignty, implicit bias, data protection, privacy, [data contamination](#)

#### 5. How should I document and disclose when I have used generative AI in my work? What level of use (e.g. brainstorming, drafting, copy editing, coding) warrants disclosure of use? How do I ensure everyone involved in the work I am doing understands how we will use (or not use) generative AI? What are the institutional expectations to consider?

### Possible supervisor strategies:

- Consult with institutional services and supports to find existing guidance and/or policies that may apply.
- Citation and disclosure practices vary by context. Check with colleagues, journals and funding agencies in your disciplinary area to consider what emerging norms for citation or disclosure may be.
- Sample acknowledgement could read: “[Name of generative AI tool] was used in the creation/drafting/editing of this [scholarly output]. I have evaluated this document for accuracy.”

### Possible discussion prompts:

- What research ethics implications and obligations do we have to consider?
- What might be some reasons our [key consulted groups] might need or want to be aware that generative AI was used in this [type of work]?

- How do we ensure that everyone involved in a project or process that uses generative AI is aware and agrees to the use?
- What possible risks to our credibility or expertise are present if we do not disclose use of generative AI in this [type of work]?
- What professional obligations do we have to be transparent with our use of generative AI in our area?

Supervisors who may want to practice this conversation ahead of time and/or receive feedback on their responses may use the following prompt in a generative AI tool of their choice to simulate the conversation and receive feedback:

- “I am a graduate supervisor in [insert your Department] at [insert your university.] My university wants all graduate supervisors to have conversations with their graduate students about the use of generative AI in the research process. They have provided the attached guidelines [attach these guidelines], including conversation starters and discussion prompts. I want to practice having this discussion with my student before I meet them. You will play the role of my graduate student, and I will play the role of supervisor. You will respond to my questions with plausible answers and make up any details related to your research that will enable you to provide nuanced and sophisticated responses. After each of my responses give me feedback on what I could say to improve my response or more information I could provide. After providing me feedback, continue with the simulation.”



**For more information, please contact:**

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WESTERN CANADIAN  
DEANS OF GRADUATE  
STUDIES

# Generative AI and Graduate and Postdoctoral Research and Supervision

20

23

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# PURPOSE

The purpose of this working group is to facilitate conversations on the role and impact of generative AI and tools such as ChatGPT among the Western Canadian Deans of Graduate Studies. The three specific objectives of the working group is to:

- Discuss the possibilities and challenges of the use of generative AI in graduate thesis, postdoctoral research, and writing including applications for admission and scholarships
- Develop a set of recommendations and best practices in advising and supervising graduate students and postdoctoral fellows
- Develop recommendations for the ways in which educational opportunities can be provided for graduate students, postdoctoral fellows, and supervisors to develop and enhance AI literacy

# CONTEXT

According to the latest available data, ChatGPT currently has over 180 million users. And the website currently generates 1.8 billion visitors per month. Since November 30, 2022, when ChatGPT became publicly available numerous articles and news stories have been published about the promises and possibilities as well as pitfalls, risks, and positive and negative impacts of generative AI. At the same time a growing number of generative AI tools are becoming available including Microsoft Bing, Google Bard, Perplexity.AI, and other generative AI tools for text-to-image generation such as DALLE, Stable Diffusion, Midjourney, Jasper.Ai.

## **Generative AI and Graduate and Postdoctoral Research**

There are several opportunities for the use of generative AI in graduate and postdoctoral research and writing, including generating thesis topics and ideas, conducting literature reviews, text summarization and synthesis, data analysis, prototyping and simulations, public communication, and presentation, drafting and editing, and coding.

However, there are significant concerns, issues, and risks associated with the use of these tools. These may include ethical, scholarly, and academic integrity issues around the use of generative AI tools such as

- Plagiarism, cheating, misrepresentation of data and authorship
- Data and algorithmic biases: discriminatory, inaccurate outputs
- Incomplete data and quality of generated text
- Data and citation fabrication and hallucination
- Data privacy and confidentiality
- Difficulty in replication of results
- Lack of transparency around the underlying data used for training the underlying language models
- Inability to handle ambiguous and controversial topics and queries
- Equity: Students who have money can access better AI than those who cannot

Graduate admission and postdoctoral research and writing may include a broad range of assessments and activities that have implications for the use and impact of generative AI, including but not limited to:

- Graduate admissions (statement of purpose/intent)
- Postdoctoral appointment (research proposal writing)
- Writing comprehensive exam
- Candidacy proposal
- Manuscripts for publication
- Thesis writing
- Citations and references
- Scholarships and awards proposals

### **Working Group Membership**

Ali Shiri, Vice Dean, Faculty of Graduate and Postdoctoral Studies, University of Alberta (Chair)

Todd Duhamel, Associate Dean (Health Sciences), University of Manitoba

Manish Pandey, Acting Dean of Graduate Studies, University of Winnipeg

Kendra Stiwich, Director, Graduate Studies and Student Research, Vancouver Island University

Jay Friesen, Educational Curriculum Developer, Faculty of Graduate and Postdoctoral Studies,  
University of Alberta

### **Meetings**

The Working Group will meet on a biweekly basis starting in late July 2023 to develop a set of proposed recommendations to be presented at the Canadian Association for Graduate Studies Annual Conference in November 2023 in Victoria.

### **Deliverables**

- A set of recommended practices for graduate deans, associate deans, and supervisors to advise graduate students on the use of generative AI in graduate research and writing, including possible references in policy documents such as student code of conduct, research, and scholarly integrity Policy.
- Suggestions for the ways in which graduate supervisors and students can develop AI literacy (academic integrity and ethics courses, postdoctoral PD, graduate teaching and learning courses etc.)

**Deliverable 1: A set of recommended practices for graduate deans, associate deans, and supervisors to advise graduate students on the use of generative AI in graduate research and writing, including possible references in policy documents such as student code of conduct, research, and scholarly integrity policy.**

## RECOMMENDATIONS

The increasing role of generative artificial intelligence (AI) for university users opens opportunities for creativity and innovation that require our careful attention. This document provides a starting point, offering recommendations of how we can collaboratively move forward with shared goals in mind.

### 1. University-wide Responsibilities and Considerations.

As universities navigate the complexities of AI, they will need to ensure that its use allies with its academic goals, ethical commitments, and legal requirements. This process goes beyond learning what AI tools can create and includes an active commitment from faculties, departments, and units.

Recommendations:

- Establish unit-level expectations/regulations about when it is appropriate, or not, to utilize AI in academic writing for graduate program requirements. These expectations and regulations should be iterative, inviting feedback from all stakeholders.
- University administrators should identify the multiple institutional policies that are impacted by the use of AI and revise/enhance those policies to adapt to the emergence of generative AI tools where necessary, or identify how policies are interpreted/applied within the context of AI
  - Institutional applications will vary; for instance, the University of Manitoba instructs students that unless their instructor advises otherwise, they are not allowed to use generative AI (University of Manitoba, News Today, 2023). Vancouver Island University Faculty of Science and Technology has guidelines for instructors to communicate their stance on AI by creating clear expectations (Vancouver Island University, Faculty of Science and Technology, 2023). There's no one-size-fits-all approach but, rather, a need for ongoing discussions to craft approaches.
- Prioritize developing clear yet flexible university guidelines acknowledging diverse opinions and stances across all organizational levels. The goal is to strike a balance between something broadly applicable across the institution and uniquely adaptable where possible.

- Prioritize accessibility by leveraging AI to support those with disabilities. This can include developing text-to-speech tools, language modification, and assistive writing, to name only a few of the many possibilities.
  - As one of many potential applications, one example might be how generative AI could significantly aid individuals with autism by offering more tailored communication and learning solutions. These include augmentative and alternative communication tools, and individually customized educational resources.
- Include the voices of marginalized communities in the development of AI policies and usage. This involves ensuring informed consent, safeguarding privacy, and diligently working to eliminate biases in AI systems. Collaborations across intersectional groups are essential to developing beneficial, respectful, and responsive AI uses that respect everyone's unique needs and perspectives.
- Gain clarity on universities' legal requirements in the context of AI, particularly regarding data privacy and intellectual property.
- Develop guidelines on the intellectual property implications of the use of generative AI, including copyright and patents with regards to thesis research and publications.
- Stay informed about changing expectations for items such as grants, funding applications, and other academic tasks. For example, the Canadian Institutes of Health Research have updated their [Fall 2023 Project Grant Competition](#), clarifying questions about authorship, peer review, and the need for ongoing adaptations as technology evolves.

## 2. Academic Writing: Theses, Dissertations, Course assignments, Candidacy and Research Papers

Generative AI can significantly streamline academic writing, particularly when drafting and revising multiple versions of complex texts. However, its use raises important questions about academic integrity and the originality of scholarly work. Individual academic programs and units may address these questions using the following recommendations.

### Recommendations:

- Users of AI tools must be aware that they are, ultimately, responsible for the academic integrity of the scholarly work, as well as the accuracy of citations listed in their writing.
- Users who use AI-powered tools for writing must provide a Transparency Statement explaining how AI algorithms, tools, or applications were utilized in their process.
- Hold skill-building workshops: Arrange workshops that train both supervisors and students/postdoctoral fellows to integrate AI tools responsibly and effectively into their academic careers, highlighting where people can learn different aspects from one another. These workshops are excellent examples of co-learning and developing AI strategies collaboratively.
- Provide ethics seminars or similar opportunities: Offer seminars focusing on the ethical considerations of using AI in academic writing or put it in your ethics courses students take when entering the university.
- Acknowledge limitations: Have users acknowledge the limitations of using AI in their writing process, including biased, discriminatory, incomplete, and inaccurate information.

- Use peer reviews: Incorporate peer review sessions focused on AI tools' ethical and practical use. These reviews could be a part of existing courses or standalone events.
- Provide educational opportunities for students, postdoctoral researchers, and thesis supervisors regarding the editorial policies and author guidelines of scholarly and academic journals and publishers when they prepare a manuscript for publications. Different scholarly disciplines may have specific requirements for authors to transparently disclose the use of generative AI in the methodology or materials and methods sections.

### 3. Research (Idea Generation, Literature Reviews, Data Analysis)

Generative AI can be valuable in the ideation, literature review, and data analysis stages. However, there is the risk of producing work that lacks the thoughtfulness of traditional scholarly work or hasn't undergone the usual human checks for quality and validity. Therefore, scrutiny is required to harness the benefits without compromising academic and ethical standards.

#### Recommendations:

- Make it clear that it is the user's responsibility to manage and ensure the accuracy of citations.
- Collaborate between users: Embrace the research process as a shared journey between student and supervisor. Using generative AI can become an educational experience for both, evolving their understanding of AI's role in academia.
- Set boundaries: Ensure everyone knows the ethical guidelines and limitations surrounding using AI in academic research. This should be a shared responsibility to ensure no boundaries are crossed.
- Model how to analyze data: Human researchers should conduct a parallel assessment of all AI work to identify AI limitations or biases as the algorithm analyzes the data.
- Acknowledge that AI tools are shaped by the knowledge bases behind their algorithms, which have historically underrepresented Indigenous epistemologies compared to Western ones. This imbalance calls for a mindful approach to the ethical and socially responsible use of AI, considering the colonial influence on generative AI and its impact on Indigenous Peoples. Addressing how Indigenous knowledge and perspectives are integrated into AI, especially regarding data acquisition, ownership, sovereignty, and consent, is essential.
- Remain aware that Large Language Models (LLMs) can perpetuate biases present in their training data, often impacting marginalized groups. For developing and using LLMs, it is essential to recognize and mitigate these biases by using diverse, inclusive data sets and maintaining transparency in processes. Such measures are vital for creating and using AI technologies that are fair and equitable, representing all societal segments, especially historically underrepresented or misrepresented groups.
- Continue to focus on developing critical thinking skills: Use the collaborative research process as a learning opportunity to teach critical skills like data verification, ethical consideration, and algorithmic understanding.
- Build institutional memory: Document recommended practices and lessons learned to contribute to institutional memory and guide future student-supervisor collaborations.
- Ensure data security: Establish secure methods for storing AI-generated data.

- Develop frameworks: Create appropriate documents (guidelines, policies etc.) to govern the secondary usage of data in AI tools. These policies might look at how consent, equity, and transparency can guide responsible data reuse.
- Educate researchers, supervisors, PDFs, and graduate students about your institution's Responsible Conduct of Research policy and its intersection with AI.

## 4. Citations and References

AI technology offers convenience in automatically generating citations, a task often seen as laborious. Yet, the technology is not foolproof and may produce inaccuracies or incorrect references. Generative AI tools such as ChatGPT are known to fabricate and hallucinate citations, references, and information such as plausible-sounding false statements and quotes from non-existent experts. As such, AI technology users should be taught to validate AI-generated citations manually to maintain the quality of academic discourse.

Recommendations:

- Shared credit: In instances where generative AI contributes significantly to the research outcome, develop guidelines for appropriately allocating credit among students, supervisors, and the AI tool.
- Allow time to make this work: Emphasize allocating time for manual verification of automated citations using credible scholarly sources.
- Verify sources: Develop guidelines for verifying the reliability of sources cited by AI tools.
- Train users on how to use tools: Offer training sessions on recommended practices for citation management with AI tools.
- Explanations of how to cite AI in various citation styles, including examples, are often found on the institution's library website ([example](#)).

## 5. Graduate and Postdoc Application Proposals

Generative AI in academic applications offers both efficiency and challenges, particularly in retaining the human touch that distinguishes each applicant. The balance between efficiency and authenticity is mostly uncharted territory in academia, creating institutional blind spots. Conversations among educators, students, and administrators about what an "honest" representation of academic work looks like in the era of AI are, therefore, critically needed.

Recommendations:

- Set clear goals: Develop and disseminate guidelines that clarify how AI-generated application materials should align with the ethos and expectations of the institution. Include these guidelines in admissions documents.
- Institutions must clearly articulate their expectations about the use of AI tools in the creation of Graduate and Postdoc applications within their Graduate and Postdoc application pathways.
- It is the student or postdoctoral fellow's responsibility to be aware of, and adhere to, institutional expectations about the use of AI tools in the creation of Graduate and Postdoc applications.

- Maintain unique voices: Reinforce the importance of users maintaining their own voice in AI-assisted drafts. Offer workshops or guidelines on integrating AI tools without compromising individuality.
- Identify current gaps: Conduct institutional audits to pinpoint blind spots in current policies and practices concerning the use of AI in academic applications.

## 6. Scholarships and Awards Application Proposals

From a university's perspective, generative AI in scholarship applications introduces practical and ethical hurdles. The use of AI can result in applications that look too similar, making it difficult to identify uniquely deserving scholarship candidates. On the ethical side, AI could carry unnoticed biases, raising concerns about fair evaluations. These complexities make it clear there is need for open discussions among university staff, students, and decision-makers to navigate the ethical implications effectively.

Recommendations:

- Figure out how to evaluate distinctive merit: Implement measures to identify the unique qualities of each scholarship applicant, even when AI tools have been used. This could involve supplementing the application with human-reviewed essays or interviews that allow the candidate's unique attributes to shine through.
- Create transparent standards: Create a set of ethical standards that specifically address the potential biases and pitfalls of using generative AI in scholarship applications. Incorporate these into existing scholarship criteria to ensure fair evaluations.
- Have dialogues: Host regular discussions among scholarship committees, faculty, and students to explore the ethical implications of generative AI in scholarship applications. These conversations should define what constitutes an authentic and ethical scholarship application.
- Share recommended practices: Publicly release a well-documented guide on recommended practices for using AI in scholarship applications. Make this document accessible to all educational institutions for adaptation and use.

## Transparency Statement

This document was created through a synergy between human skills and AI algorithms. Specifically, Perplexity.ai was used to find relevant material and suggest high-level categories for analysis. Additionally, prompts on specific topics were given to ChatGPT to generate ideas. The final document was comprehensively reviewed and edited by our team. Each element was written by our team, with copy-editing and phrasing help through Grammarly. The use of AI in this manner is consistent with the guidelines and recommendations presented in this document, embodying a balanced approach to incorporating emerging technologies in academic settings.

Other examples of disclosure statements have been created in places like [Elsevier](#), [Nature](#), and the [Proceedings of the National Academy of Sciences](#).

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## **Deliverable 2: Suggestions for the ways in which graduate supervisors and students can develop AI literacy (academic integrity and ethics courses, postdoctoral PD, graduate teaching and learning courses etc.)**

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## **DEVELOPING AI LITERACY**

The following list is adapted from an upcoming article in *University Affairs*:

Friesen, J. & Polziehn, R. Embracing the Unknown: AI, Higher Education, and the Future of Academic Supervision, *University Affairs* (in press).

- Co-learning AI proficiencies: In our roles, AI fluency is not just beneficial; it's necessary. This fluency isn't about outpacing one another in mastering the technology but instead engaging in a shared learning experience to foster dialogue. Take time for professional development with your graduate students and then reflect on those learnings.
- Promoting ethical uses of AI: We should strive for collaboration that includes creating transparent guidelines for AI usage in academic endeavours. More than just advising students to cite AI tools and specific prompts, initiating collective dialogues on ethical considerations is foundational.

- Nurturing critical thinking with AI proficiency: Cultivating a questioning mindset in students is essential, but it's also something supervisors can actively encourage. The focus should be on nurturing skills for critically evaluating AI applications, data literacy, and the nuances of AI tools like ChatGPT. This endeavour stresses the importance of continual engagement with the subject matter.
- Addressing the AI access divide: With AI becoming a staple in academic research, tackling economic and technical access disparities is crucial. Allocating targeted resources such as free tool subscriptions can make a significant difference, but this should be across all universities to ensure an equitable and inclusive academic landscape.
- Engaging students in decisions that affect them: Since students are often the early adopters of AI in academia, their perspectives are invaluable in forming institutional AI policies. Encouraging their voices in decision-making and curriculum adjustments can engender a more comprehensive understanding and responsible engagement with AI's ethical considerations.
- Encouraging student involvement in research planning: As both students and supervisors become increasingly adept at using AI tools, active participation from both parties in crafting the research agenda is beneficial.
- Fostering Interdisciplinary Conversations: Given AI's vast applications across disciplines, creating spaces for cross-disciplinary discussions among students and supervisors can yield unique insights and foster innovation.
- Ensuring Mental Wellness in the AI Era: The pressure to keep up with rapidly evolving AI technologies can overwhelm students and supervisors. Encouraging open dialogues about the stressors associated with AI adaptation and offering mental health resources tailored to these specific challenges can support well-being in the academic community.

Below is a list of tools that people can explore to better understand the ways you can use AI:

### **Chatbots**

Chatbots utilize artificial intelligence for diverse interactions, making them suitable for queries, support, or even storytelling exercises in the classroom.

1. ChatGPT
  - a. Offers conversations based on OpenAI's GPT technology. (<https://chat.openai.com/>)
2. Bing Chat
  - a. Microsoft's chatbot through the Bing search engine. It's helpful for quickly clarifying academic search queries. (<https://www.bing.com/chat>)
3. Poe AI
  - a. Multiple AI chatbots all in one place, including ChatGPT and GPT-4. (<https://poe.com/login>)

### **Text-to-Image Tools**

These platforms offer creative image generation from textual input, allowing for compelling visual presentations and course materials.

4. Adobe Firefly
  - a. Text-to-image AI from Adobe. (<https://firefly.adobe.com/inspire/images>)

5. Bing Image
  - a. Microsoft's text-to-image tool. (<https://www.bing.com/create>)
6. Stable Diffusion
  - a. Deep learning-based text-to-image platform. (<https://clipdrop.co/stable-diffusion>)
7. Recraft AI
  - a. Generates vector art and 3D images. (<https://app.recraft.ai/projects>)

## **Other Tools**

Diverse platforms that capitalize on AI for various creative and efficiency-driven tasks. Great for extending the capabilities of traditional academic tools.

8. D-ID
  - a. Transforms photos into video presenters and avatars. (<https://studio.d-id.com/>)
9. Synthesia
  - a. Generates videos from text or voice inputs. (<https://www.synthesia.io/>)
10. Perplexity AI
  - a. Specializes in AI-driven data analysis, reviewing research and literature, and visualizations. (<https://www.perplexity.ai/>)